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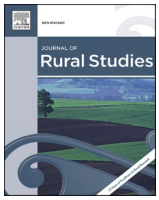

Living on an Island: Start-ups, spatial heterogeneity and remote entrepreneurial ecosystems

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ABSTRACT

In this paper we focus specifically on start-ups in remote island entrepreneurial ecosystems (EEs) and consider the differences between these entrepreneurs compared to their mainland Scottish and UK counterparts. We find that Island new start-up entrepreneurs tend to be older, less well educated, more likely to be female, and less likely to be from an ethnic minority. They borrow similar amounts of start-up capital than their mainland counterparts and are equally likely to survive. Despite their geographical remoteness, this suggests that entrepreneurial activity makes a meaningful contribution to their respective EEs.

1. Introduction

This paper explores start-ups in a particularly challenging and remote spatial context: the Scottish Islands. Start-ups have the potential to create significant economic advantages in their localities if they survive, grow and thrive underpinning the economic dynamics of local economies (Gries and Naudé, 2009). Indeed, it is now a widely held view that "stimulating the founding of new firms will have a considerable positive impact on regional employment" (Fritsch, 1997, p. 437). In addition to local job creation, start-ups contribute to local economic multipliers (Tödtling and Wanzenböck, 2003; Cowling and Nadeem, 2020) and population retention in their respective localities (Qu and Zollet, 2023). Yet, many new start-ups fail to continue trading beyond their formative years and this means that their economic impact is both limited and ephemeral (Hyytinen et al., 2015; Boyer and Blazy, 2014).

It is also the case that the rate of new business start-ups, and thus their economic contribution, varies substantially across countries (Reynolds et al., 1994; Ortega-Argilés, 2022), regions (Davidsson et al., 1994; Naude et al., 2008), across urban and rural environments (Lavesson, 2018; Tödtling and Wanzenböck, 2003), and between core and peripheral regions (Oyarzo et al., 2020). In line with the so-called "*urban incubator hypothesis*" posited by Tödtling and Wanzenböck (2003), urban areas overwhelmingly and consistently display significantly above-average start-up rates, a finding corroborated by a vast swath of research conducted across many countries (Reynolds et al., 1994; Naude et al., 2008; Oyarzo et al., 2020).[1] Importantly, the historical roots of these spatial variations are temporally enduring and deeply culturally embedded (Fritsch and Wyrwich, 2017; Fritsch et al., 2019). Conversely, studies also show that small businesses operating in rural regions, away from urban centres or big cities, often have different attributes, such as strong local ties, but weak connections to customers, suppliers and different development activities (Greenberg et al., 2018). In a nutshell, context and place matters enormously as a factor mediating the entrepreneurial process (Welter, 2011; Korsgaard et al., 2015).

Despite this large body of start-up literature on entrepreneurship across geographic space, only a very limited number of studies have specifically considered islands as a spatial unit of analysis for examining start-up behaviour (Baldacchino et al., 2008; Mendez and Thompson, 2008; Freitas and Kitson, 2018), much of which focuses on tourism and hospitality firms (Armstrong et al., 2014; Booth et al., 2020). In this paper we explicitly address this gap by considering the Scottish Islands as a distinct geographical unit that is fundamentally different from both

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[1] Fritsch (1997, p. 444) calls this the 'core-periphery downward trend' in founding activities.

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mainland Scotland and the wider UK in terms of their history and geography. They are also characterised by their extreme physical remoteness (for example, the Aberdeen to Lerwick on the Shetland Islands ferry route takes 12 and ½ hours), their distance from the capital city of Scotland, Edinburgh, which is, for example, 386 miles in the case of the Shetland Islands and 227 miles in the case of the Isle of Skye. The island communities of Skye, the Western Isles, and the Argyll Islands are regarded as the heart of Gaelic Scotland and together with the Highland region account for 55% of Scotland's 58,652 Gaelic speakers.[2]

We wish to contextualise this study via the conceptual paradigm of entrepreneurial ecosystems (EEs). In recent years, EEs have become a leading conceptual approach to explore regional entrepreneurial phenomena (Spigel, 2017; Brown et al., 2023). Essentially, EEs are viewed systemically as "set of actors and institutions that assist in the creation and growth of start-ups" (Li et al., 2022, p. 5). The literature on EEs has grown rapidly and has charted considerable variations in entrepreneurial activity dissecting different spatial locations (Brown and Mason, 2017), both in advanced and developing economies (Cao and Shi, 2021). Owing to the dominant focus on high growth, high-tech entrepreneurship in the EE literature some maintain the construct is an inappropriate lens to examine rural locations (Muñoz and Kimmitt, 2019). We respectfully beg to challenge this erroneous viewpoint. EEs as a systemic concept is equally applicable to examine entrepreneurship in densely populated urban and sparsely populated rural areas (Miles and Morrison, 2020; Daniel et al., 2022). There is no "one-size-fits-all" emblematic ecosystem, rather at its core is pervasive heterogeneity and extreme complexity (Roundy et al., 2018; Brown et al., 2023). Therefore, the marked differences between urban and rural EEs need to be recognised and unpacked accordingly (Brown and Mason, 2017; Hammer and Frimanslund, 2022). These distinctions are especially important in the context of remote islands which offer unique opportunities for entrepreneurs to build spatially protected and localised monopolies in certain market areas (Baldacchino et al., 2008; Burnett and Danson, 2017).

Indeed, a recent strand of the literature on EEs has started to examine the particular nature of resilience in fragile rural (Roundy et al., 2017; Pickernell et al., 2019; Miles and Morrison, 2020) and spatially remote communities (Freitas and Kitson, 2018). This has found these resource constrained EEs to have certain discernible characteristics demonstrating how "rural entrepreneurs face unique challenges relating to geographical, social, institutional, and market access conditions, often resulting in constraints on entrepreneurship and economic growth" (Miles and Morrison, 2020, p.934). However, with a few exceptions (Phillipson et al., 2019) the literature has largely failed to specifically compare the qualitative nature and dynamics of entrepreneurship in these types of communities with entrepreneurs in more urbanised and more densely populated locations. This paper seeks to redress this omission within the EE literature by specifically comparing rural island entrepreneurs to those located elsewhere on the Scottish and UK mainland.

Another key aim of the paper is to contribute to the controversial and heated policy debate surrounding support for entrepreneurial start-ups (Shane, 2009). Indeed, there has been a consistent and universal level of public policy support for new business start-ups dating back to the 1980s in many advanced countries (Wagner and Sternberg, 2004). A specific focus of these policies has targeted unemployment to help facilitate the business start-up transition given the inability of the waged sector to absorb all those individuals without work but available to work (Baumgartner and Caliendo, 2008). However, evidence of the efficacy of these support instruments remains mixed and inconclusive (Dvouletý and Lukeš, 2016). One such instrument is the UK's Start-Up Loan scheme (SUL) which is the empirical focus of the current paper. A disproportionate share of SULs are issued to previously unemployed people to support their transition into self-employment (Cowling and Dvouletý, 2022). The unique data set interrogated allows us to explore the dynamics of entrepreneurship at a very granular level enabling insights into the benefits of this scheme in different spatial contexts.

The paper addresses two core research questions. First, are Scottish Island business start-ups fundamentally different from their mainland Scotland and wider UK peers? Second, do Scottish Island start-ups have higher failure rates as predicted by spatial start-up theories, or lower failure rates as predicted by spatial protection theories? To address the former question, we use a set of probit models, while for the second question we employ the Cox proportional hazard model. We find that Scottish Island new business start-ups are populated by older entrepreneurs, have lower levels of formal education, more vocational qualifications, more likely to transition from unemployment, and are more likely to be female than their mainland Scottish peers. In many ways Scottish Island start-ups are closer to the general UK start-up than a typical Scottish mainland start-up. In addition, we find no significant differences in new business start-up failure rates on the Scottish Islands compared to mainland Scotland or the wider UK. In this sense, it would appear that encouraging new business start-ups on the Scottish Islands can be as valid as encouraging a business start-up anywhere else in the UK in terms of their potential economic contribution.

The paper unfolds as follows. Section 2 reviews relevant conceptual and empirical literature. Section 3 discusses the data, methods and descriptive statistics. Section 4 reports and discusses our formal econometric analysis relating to (a) differences in Scottish Island start-ups, and, (b) differences in survival and hazard rates. The penultimate section discusses the findings while section 6 presents the conclusions.

2. Literature review

2.1. Going beyond the urban-periphery divide

Economic geography has long highlighted the intra-country distinction between large urban centres and peripheral areas. However, the basic urban-periphery dichotomy tends to overlook the existing heterogeneity across peripheral areas. Our aim is thus to highlight the distinctive socio-economic characteristics of small islands. To start with, small islands exhibit a strong sense of community and local identity (McCall, 1994; Cottrell, 2017; Nielsen, 2022). In Scotland, evidence from the Scottish Household Survey shows that Outer Hebrides, Orkney and Shetland rank at the very top of the country in terms of community belongingness. Second, small island communities are typically characterised by high levels of familiarity (Hayfield and Schug, 2019). People living in small islands tend to know each other well, form close social networks and routinely maintain 'out of hours' interactions (Korsgaard et al., 2015).

Combined, the strong sense of community and close social networks make island entrepreneurs more reliant on informal networks, such as family and friends, rather than formal structures, for resolving their economic problems (McCall, 1994; Azzopardi, 2015). Psychologically, reliance on informal networks enables trust, confidence and a sense of empowerment, contrary to the suspicion and fear often felt towards formal structures, authorities and regulations (Korsgaard et al., 2015). To belong to a closed island community often translates into economic capital (Gibbons, 2010). For start-ups, this type of economic capital can also enhance their resilience to adverse economic conditions (e.g. by allowing them access to informal borrowing).

Small islands also exhibit their own demographic and economic characteristics. First, small islands face strict limits in labour supply, especially due to outmigration for better career prospects or lifestyle reasons (Baldacchino, 2005; Armstrong et al., 2014). Conversely, and in line with Baldacchino's "brain rotation" thesis, many small islands attract potential entrepreneurial incomers via in-migration (Baldacchino, 2006; Nielsen, 2022) which some dub "commercial

[2] https://www.abdn.ac.uk/sll/disciplines/gaelic/where-is-gaelic-spoken-324.php#:~:text=Today%2C%20the%20Highlands%20and%20Islands,as%20the%20'Gaelic%20heartlands

counterurbanisation" (Mitchell and Madden, 2014). Second, small islands provide a narrow domestic market, as well as a narrow space for local firms to benefit from economies of scale. On the other hand, small islands provide entrepreneurs with an environment of low firm rivalry. Further, small islands tend to rely on niche market specialisations, such as tourism and agriculture (Armstrong et al., 2012, 2014). Such a niche specialisation enables an island to capitalise on its geographical uniqueness and natural endowments. On the downside, a niche specialisation and inability to diversify production can make a small island vulnerable to sudden changes in economic conditions (Armstrong et al., 2012, 2014).

2.2. Entrepreneurial ecosystems and rural economic development

During the last decade the conceptual paradigm of EEs has become a central and burgeoning feature of the literature on the economic geography of entrepreneurship (Brown et al., 2023). The literature marks the change within entrepreneurship from a predominant focus on individuals to a re-orientation to a wider array of external enablers which mediate entrepreneurial action. At the centre of this systemic concept is the centrality of institutional actors, processes and relational interconnections underlying the entrepreneurial process (Spigel, 2017). Central to the concept is the crucial role of geographic context as a key variable mediating the entrepreneurial process. Under this perspective access to resources (be they finance, networks, suppliers, customers, human capital, knowledge and advice) to execute entrepreneurial endeavours is fundamentally governed by an entrepreneur's contextual situation (Brown and Mason, 2017).

Given the centrality of "external enablers" behind the entrepreneurial process we would anticipate that peripheral localities, such as small islands, would encounter large constraints to entrepreneurial activity. Importantly, some scholars note that peripherality is both a function of geographic and network remoteness. For example, Glückler et al. (2023), suggest that geographic peripherality cannot be properly analyzed without making a clear distinction between *geographic* peripherality (location in territory) and *network* peripherality (position in a network). Some scholars have drawn on resource dependency theory (RTD) as a theoretical viewpoint for helping shed light on the inherent constraints in fragile EEs (Roundy and Bayer, 2019). It is commonly accepted in the organizational literature that resources that cannot be produced internally must be obtained from external stakeholders (Pfeffer and Salancik, 1978). Arguably acquiring resources is a difficult task to negotiate especially in *de novo* start-ups and, arguably "the greatest challenge" faced by entrepreneurs (Roundy and Bayer, 2019, p.10). This is often accentuated in EEs where resources (e.g. networks, contacts, mentors, end-users etc) and infrastructure are unavailable, anaemic or under-developed (Brown and Mason, 2017; Pickernell et al., 2019).

However, it is important to remember that despite their systemic weaknesses strong levels of entrepreneurial agency can often obviate these structural difficulties in certain problematic circumstances (Isenberg, 2011). Ultimately, this means we should expect "substantial heterogeneity in the inputs required to build a well-functioning entrepreneurial ecosystem as well as differences in the outputs of ecosystems with similar structures" (Wurth et al., 2021, p. 748). For example, recent interesting empirical work in rural EEs shows how start-ups in extremely geographically remote communities in Norway help overcome a lack of resources such as network connectivity and finance via multiple improvisational strategies (e.g. local financial re-cycling) to help alleviate their immediate resource constraints (Frimanslund, 2022; Frimanslund and Nath, 2022). Central to the concept of EEs is the importance of entrepreneurial agency and how astute entrepreneurs are able to navigate their entrepreneurial journey even when factors and conditions are not conducive to entrepreneurial activity.

2.3. The general theory of start-ups and space

While research has made "great strides" explaining why some people become entrepreneurs and others do not, the explanatory factors behind a start-up's growth performance is much more opaque and contested (Combs et al., 2023, p.1). Gries and Naudé (2009), in developing their general theory of start-ups, begin with the assumption that new businesses, which are overwhelmingly very small in scale, supply intermediate goods and services to the final end-users. We recognise that this is a big starting assumption as the data shows that many small firms are located in industry sectors such as hospitality and retailing which have low barriers to entry and with low margins. However, by definition, these are also industry sectors that are characterised by seasonal and part-time employment and make a modest contribution to value added and economic well-being (Qu and Zollet, 2023). Setting this to one side for the moment, a hugely important assumption that has direct relevance to our study, and particularly to the island context, is that new firm activity is local, and the intermediate goods and services are offered to a local final product or service firm. This creates a closed ecosystem to all intents and purposes and this feature is supported by empirical evidence on small firm markets in the UK which tend to incur strong "liabilities of distance" in the spatial market reach (both in terms of resource acquisition and market access) of these firms (Lee and Brown, 2017; Cowling and Nadeem, 2020).

In terms of how this local market focus impacts on new business start-up activity, Ciccone and Matsuyama (1996) find that if a spatial economy has a limited range of intermediate goods and services producers (small firms), then the final-end user sector will have a restricted demand for new and differentiated inputs that would be provided by new business start-ups. Thus, the nature of the industrial structure and composition of end users present in a locality will define the opportunities available for new firms. Where there is a limited set of end producers, a local economy can get stuck in an under-development trap characterised by low levels of entrepreneurial dynamism, innovation and minimal product and service differentiation (Capozza et al., 2018; Muñoz and Kimmitt, 2019).

Formally, Gries and Naude's (2009) start-up model can be expressed as a defined economic region having a population of small firm, N, that each produces a differentiated product or service, x_i. The total final products and services, Y, is produced with local labour and human capital, H, and N local intermediate inputs, x_{ij}, supplied by the N, small and local firms. Labour and human capital is not mobile across local economic regions, which is likely to be the case for island populations in our analysis. The production function for the representative local final producer, $_I$, can be expressed as: $Y = AH_i^{1-\alpha} \sum(x_{ij})\ \alpha$. The important element of the function is *A* which relates to the degree of urbanisation and captures positive effects from localisation and urbanisation economies on a firm's total factor productivity. Thus, our small firm sector supplies intermediate goods and services to the '*closest urban centre available*'. For small firms located on many Scottish islands this is a long way in physical miles and travel time.

As new business start-ups face non-trivial and often sunk costs of enacting their new business, this acts as a deterrent for new entrepreneurial activity. Relating this specifically to our island context, inasmuch as the resources needed by the entrepreneur to activate their new business, such as capital, access to labour, access to information and legal services etc may not be present or be less available than in mainland localities and urban centres, we would predict a lower rate of new business activity.

Dinlersoz et al. (2023) find that observable local demographic, economic, financial, and business conditions account for a significant fraction of the variation in start-ups per capita. In their US study on the local origins of business formation Dinlersoz et al. (2023, p.3) "find that the magnitude of [local] spatial variation in start-ups per capita is enormous". Their approach is related to Gries and Naudé (2009) but takes the presence of ideas in a locality as their focal point upon which

new entrepreneurial activity is underpinned. More importantly, it is the 'quality of ideas' that determines the potential returns to new entrepreneurial activity and informs the start-up decision. Formally, economic activity occurs in a large number of local ecosystems denoted by the set $\int$. In each local economy, $l \in \int$, there lives a continuum of N_l people, and each person is assumed to have an idea, $_I \in [0, \infty]$, for new entrepreneurial activity. The higher the value of I, the higher quality the idea, and the higher the expected returns to acting on that idea through the formation of a new business.

In equilibrium, each specific element of the local environment and ecosystem will be a function of local characteristics and conditions, and those in other localities. These elements might include population demographics, demand for goods and services, agglomeration, amenities and public services, industry composition, labour markets etc.

2.4. Market size and local monopolies

Ciccone and Matsuyama (1996), hold that because of non-trivial start-up costs that deter many potential entrepreneurs with (lower quality) ideas from activating a new business start-up, specialist firms that are able to produce intermediate goods and services are subject to dynamic increasing returns to scale. It follows that the decision to start-up depends on the size of the potential market, and the degree to which the output of the new small firm is differentiated from the output of their incumbent rivals, the degree of differentiation. In this respect, the new firm producing a differentiated product or service can become a local monopolist even when its share of total output is small.

This has particular traction in a remote or peripheral locality, and specifically for us, an island economy. Talented entrepreneurs who can identify such opportunities for producing sufficiently differentiated products or services within a locality can act on these opportunities to become a local monopolist and in doing so extract supra-normal profits from their activities. This degree of differentiation also provides benefits to intermediate and final consumers whose welfare and utility increase with the supply of differentiated products and services and this also increases economic growth.

So, is there any evidence to support the existence of local small firm monopolies? Cowling and Nadeem (2020), in their empirical classification of what classic market structures small firms operate under reported that 4.1% were effectively monopolists in their local market, 6.80% operated in an oligopolistic market with a few dominant producers, 31.96% were on the borderline between oligopoly and monopolistic competition, 32.10% were on the borderline between monopolistic competition and perfect competition, and only 24.95% were in markets that approximated perfect competition. In this sense, it is apparent that at least 43% of UK small firms have a significantly differentiated product or service in their local market, and potentially three-quarters produce output that has some level of differentiation.

This is important as it implies that if a latent entrepreneur has an idea that corresponds to a product or service that is sufficiently different from those currently offered in their local market, then they will be protected to varying degrees from intense competition, and one in twenty may be able to achieve the sort of local monopoly position described by Ciccone and Matsuyama (1996) and Gries and Naude (2009). Constructing this kind of entrepreneurial advantageous position is imperative if entrepreneurs are to grow and succeed, particularly if they're confronted with unfavourable factor conditions such as spatially remote locations.

3. Data, methodology and descriptive statistics

Here we discuss the data used for the analysis which is drawn from the management information records for the Start-Up Loan scheme (SUL) and covers 103,442 individual records for new business start-ups accessing the scheme between September 2012 and April 2023. The SUL was designed to support individuals through the start-up process and provides a loan facility and advisory and business planning support. Entrepreneurs eligible for SULs must have established a new business which has been trading for less than 36 months. SUL loans are provided from £500 up to a maximum size of £25,000 and offered at a fixed interest rate of 6% for a term between 1 and 5 years. The loan is an unsecured personal loan and loan applications are subject to a credit check. No application fee or early repayment fees are charged. The scheme (and loans) are administered by the Start-Up Loans Company on behalf of the British Business Bank.[3] Only start-ups that have exhausted all potential sources of finance (i.e they have an unmet additional need for finance) can access the SUL scheme. In this sense, it is around 10% of the total UK start-up population of 1.1m over the period 2010–2023, but a much greater proportion of the 21.14% of UK start-ups who have identified a latent need for additional finance (based on Longitudinal Small Business Survey statistics).

The individual records contain detailed information on the individual's geographic location, formal and informal human capital (highest educational level, age, and prior labour market status), personal demographics such as gender and ethnicity, and loan characteristics (size of loan and maturity days). They also contain information on whether the loan is still live (defined as not in default and still being repaid), in default (an outstanding balance is present and the loan is in default), or has been fully repaid. Importantly, if a loan ends in default, the time of that default is recorded in terms of days from the loan origination. It is this variable that supports our hazard analysis.

The Scottish SUL share of total UK start-ups is 6.49% and this is very close to the 6.43% of the total share of UK start-ups accounted for in Scotland. In this respect it is equiproportional. It is broadly representative of the general business start-up stock in terms of the age profile of the entrepreneurs, but not in respect of the gender profile as SUL has a significantly higher proportion of female entrepreneurs. The scale of SUL lending is lower than the average successful loan size offered to start-ups which is around £22,833 which may reflect the fact that it is additional to any loans that the entrepreneur has received before their SUL application. It is closer to the average credit rationed young firms loan demand which is around £16,000. Unfortunately, these data on other uses and forms of finance are not available and this is a limitation of this study. With these limitations in mind, it is also the case that a strength of this work is that it is (to our knowledge) the single largest source of exclusively start-up data available in the UK.[4]

3.1. Classifying a Scottish Island new business start-up

To start, we create a Scottish Islands classification which is coded 1 if the new business start-up is located in (a) Argyll and Bute, (b) Na h-Eileanan an Iar (Outer Hebrides), (c) North Ayrshire and Arran, (d) Orkney and Shetland, and, (e) Ross, Skye and Lochaber. In total, we have 415 new business start-ups within this broad Scottish Islands classification. However, as we are using local authority and parliamentary constituency indicators, we are not able to separate out the mainland parts of North Ayrshire or Lochaber from the island parts. This is more of

[3] https://www.startuploans.co.uk/.

[4] In terms of how representative of the general firm population, the availability of comparable data is sparse. In this sense, we see our data as novel and adding significantly to the knowledge base on island start-ups. We examined several large UK data sets including the SME Finance Monitor and LSBS but this did not allow us to generate serious comparisons. The NOMIS ONS data simply shows us that islands (as indeed the whole of the UK) is dominated by micro firms. Broadly SUL start-ups are disproportionately likely to enter from an early stage spell of self-employment or unemployment and are less likely to enter from waged employment or inactivity. In respect of educational qualifications, we observe that SUL entrepreneurs are broadly comparable to the share of the island populations with a basic school education, but much lower in respect of A Level qualifications and degree and higher degree qualifications. On gender, SUL with its high rate of female start-up is closer to the island gender population share.

a problem for North Ayrshire and Arran as the difference in relative populations is large (135,280 compared to 5,058). For Ross, Skye, and Lochaber, the relative populations are 285, 10,008, and 20,042. Thus, the raw probability of a new business start-up in North Ayrshire and Arran being from the island is 3.60%, and the equivalent for Ross and Skye (not Lochaber) is 33.93%. To address this problem with the data available, we create a second Scottish Islands classification which excludes the entire sample of new business start-ups in North Ayrshire and Arran and also Ross, Skye, and Lochaber. Neither is perfect, but without the individual postcodes, we are not able to differentiate within these two areas which start-ups are truly on the islands and which are on the mainland. Thus, our broad classification will likely overestimate new business start-up activity and our narrow classification will probably under-estimate it.

From Table 1, we observe that using the broad Scottish Islands classification, the share of Scottish Island new business start-ups out of total Scottish new business start-ups is 6.59 which equates to 415 start-ups in total. This share drops to 2.55% (171 start-ups in total) using the narrow classification. Expressed as shares of the total UK SUL start-up population, the respective Scottish Island shares are 0.40% and 0.17%. For an Island comparison, the English Isle of Wight has 252 new business start-ups and a UK share of 0.24%.

From Fig. 1, we observe that 2023 was a peak year for Island start-ups who had a share of 7.63% (4.48% using our narrow island classification) of total Scottish start-ups. This compares to a low of 5.45% (1.82%) in 2016. There is some non-trivial time-series variation in the Island shares of new start-ups, but over time this volatility diminishes. The Covid-19 pandemic period, from 2020, tended to reduce Island start-up shares which remained below 6% (3%) until a dramatic increase in 2023. This may relate to the physical remoteness of the Islands and the travel restrictions in place during the pandemic to prevent the spread of the virus.

From Fig. 2, we compare the Scottish Islands share of total UK new business start-ups. On average the share is 0.40% (and 0.17% using the narrow Scottish Islands classification), but there is significant time-series variation over the decade. From a low share in 2013 of just 0.05% (0.029%), there was a significant peak between 2017 and 2019 where shares ranged from 0.47% to 0.52% (0.22%–0.27%), before a drop off during the Covid-19 pandemic. The graph shows that new business start-up shares for the Scottish Islands are rising from a local low in 2021 of 0.39%–0.47% (0.16%–0.25%) in early 2023.

Table 1
Broad and narrow Scottish Island new business start-up classifications.

Classification	Scottish Areas	Total Number of New Business Start-Ups	Scottish Island % of Total
Broad	Argyll and Bute Na h-Eileanan an Iar North Ayrshire and Arran Orkney and Shetland Ross, Skye, and Lochaber	415	6.18
Narrow	Argyll and Bute Na h-Eileanan an Iar Orkney and Shetland	171	2.55
Scotland Total	All	6,298	
Broad	Argyll and Bute Na h-Eileanan an Iar North Ayrshire and Arran Orkney and Shetland Ross, Skye, and Lochaber	415	0.40
Narrow	Argyll and Bute Na h-Eileanan an Iar Orkney and Shetland	171	0.17
UK Total	All	103,027	

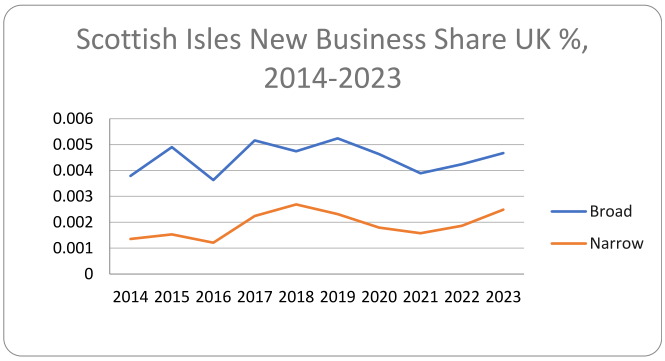

Fig. 1. Scottish Islands shares of total SUL Scottish new business start-ups, 2013–2023, Broad and Narrow Island Classifications. Notes: Blue line reports the broad Scottish Island classification and Orange line reports the narrow Scottish Island classification excluding North Ayrshire and Arran, and Ross, Skye, and Lochaber. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

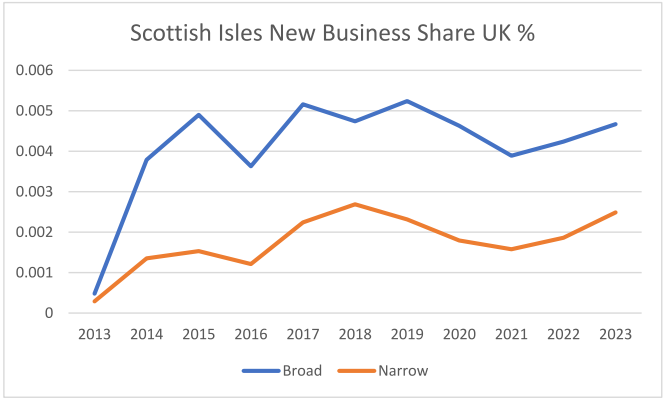

Fig. 2. Scottish Islands shares of total SUL UK new business start-ups, 2013–2023, Broad and Narrow Classifications. Notes: Blue line reports the broad Scottish Island classification and Orange line reports the narrow Scottish Island classification excluding North Ayrshire and Arran, and Ross, Skye, and Lochaber. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

The time-series dynamics show that whether the comparison is the Scottish mainland or the entire UK, the post-Covid-19 period is one where the Scottish Islands increased their new business start-up shares. However, the Covid-19 pandemic period was one where the downturn in relative Scottish Island shares was more marked when comparing against the whole UK than the Scottish mainland *per se*. Recent UK work on the nature of individuals who started a new business during the Covid-19 pandemic found that they were of significantly higher quality in respect of education and life experience, suggesting that only the very best endowed individuals were able to start-up during a crisis (Cowling and Dvouletý, 2023).

3.2. Broader differences in Scottish Island start-ups

Here we present the univariate data for Scottish Islands new business start-ups and compare them against their mainland Scotland peers, and

with their wider UK peers. The characteristics we consider are: individual age, education level, labour market state they transitioned from, gender, ethnicity, and (real inflation adjusted) loan amounts expressed in cash terms. These data are presented in full in Table 2.

Comparing Scottish Island start-up demographics with their Scottish mainland peers we find that they are over-represented in the 50+ age group (17.35%–12.10%) and under-represented in the 25–30 years old age group (20.48%–24.06%) using the broad islands classification. These age differences were not apparent using the narrow island classification. Education was also a point of difference with Scottish Island start-ups being more likely to have a basic school education (24.58%–21.44%), and less likely to be educated at UG and PG degree level (23.37%–28.50%). Again, these differences disappeared using the narrow islands classification.

Gender and ethnicity were points of significant difference too and we find that females are more highly represented in the Scottish Islands using the broad island classification (43.96%–38.58%) and the narrow classification (45.79%–38.74%). In contrast, ethnic minority entrepreneurs were less represented on the Scottish Islands using the broad classification (3.05%–8.48%) and narrow classification (1.90%–8.30%). Finally, we observe that, using the narrow island classification, Scottish Island start-ups took our larger SUL loans on average (£10,389 to £9,092).

Comparing Scottish Island start-ups against the whole UK, we find fewer significant differences than we did comparing the Scottish Islands against the mainland. The biggest differences were in relation to education, transition routes into new business start-up, and ethnic minority representation. On education Scottish Island start-ups were more likely to have a vocational education using the broad classification (41.45%–32.91%) and narrow classification (42.11%–32.93%) and less likely to have an UG or PG degree qualification using the broad classification (23.37%–31.25%) and narrow classification (26.90%–31.22%). Using the broad island classification only, we observe that transitions from full-time employment were lower for Scottish Island start-ups (24.34%–29.97%) and higher from unemployment (33.98%–26.05%). Finally, we observe that the Scottish Islands have a low ethnic minority start-up share with only 3.05% (to 21.19%) on the broad classification and 1.90% (to 21.15%) on the narrow classification.

On balance, it appears that the typical Scottish Island new business start-up entrepreneur is more similar to the average for the whole UK than their Scottish mainland peers. In terms of what this might imply for subsequent survival and default, the question is whether a vocational (practical) education is better or worse than a high university level education in terms of the relevant human capital for helping an entrepreneur navigate the early formative years of their businesses. The empirical literature is open and inconclusive on this important question. In fact, we find no significant differences in default rates (and non-survival) between Scottish Island starts and their mainland or UK peers with failure rates ranging from 6.99% to 9.36% compared to 5.93%–9.11% across the start-up populations.

4. Econometric analysis and results

Here we report on two sets of modelling. The first set of models relates to identifying what is different between Scottish Island start-ups and their mainland and UK peers using our core set of personal demographic characteristics. The second set of models explicitly question whether default hazard is different for Scottish Island start-ups.

4.1. Methodology

The first sets of models are estimated by probit as the dependent variables are expressed in binary form where 1 indicates a new business start-up is located on a Scottish Island and a 0 otherwise. As we calculated a broad and narrow Scottish Island classification variable we actually have four dependent variables for analysis. Two for broad and

Table 2
Descriptive statistics for Scottish islands, Scottish Mainland, and all UK.

Age	Broad Scottish Islands Classification						Narrow Scottish Islands Classification					
	Scottish Islands versus Scottish Mainland			Scottish Islands versus Whole UK			Scottish Islands versus Scottish Mainland			Scottish Islands versus Whole UK		
	Mainland	Islands	Significance	All UK	Islands	Significance	Mainland	Islands	Significance	All UK	Islands	Significance
18-24	13.34	12.77		13.98	12.77		13.39	9.94		13.98	9.94	
25-30	24.06	20.48		25.68	20.48		23.91	21.05		25.67	21.05	
31-49	50.51	49.40		48.22	49.40		50.40	52.05		48.22	52.05	
50+	12.10	17.35	**	12.12	17.35	***	12.31	16.96		12.13	16.96	*
Education												
Basic school	21.44	24.58		21.00	24.58		21.63	21.64		21.02	21.64	
Vocational	40.74	41.45		32.91	41.45		40.75	42.11		32.93	42.11	
Advanced school	9.32	10.60		14.84	10.60		9.40	9.36		14.83	9.36	
UG Degree	25.17	22.65		27.99	22.65		24.99	25.73		27.97	25.73	
PG Degree	3.33	0.72	**	3.26	0.72	***	3.23	1.17		3.25	1.17	**
Prior Status												
Full-time employment	25.45	24.34		29.97	24.34		25.37	25.73		29.96	25.73	
Part-time employment	6.61	7.47		8.50	7.47		6.62	8.19		8.49	8.19	
Inactive	3.95	4.82		4.59	4.82		3.94	6.43		4.59	6.43	
Self-employed (<2 years)	27.98	29.40		30.89	29.40		28.00	30.41		30.88	30.41	
Unemployed	36.01	33.98		26.05	33.98	***	36.06	29.24		26.08	29.24	
Female %	38.58	43.96	**	39.94	43.96	*	38.74	45.29	*	39.95	45.29	
Ethnic Minority %	8.48	3.05	***	21.19	3.05	***	8.30	1.90	***	21.15	1.90	***
Real Loan Amount £s	9,127.75	9,085.27		9,603.05	9,085.27	*	9,092.08	10,389.38	**	9,649.55	10,389.38	
Default %	5.95	6.99		9.11	9.36		5.93	6.99	*	9.10	9.36	
Loan maturity days	1,596.56	1,589.37		1,591.14	1,589.37		1,595.39	1,123.91		1,591.08	1,123.91	

narrow island classifications and two for comparing against mainland Scotland or the whole of the UK. The probit model is such that the cumulative standard normal distribution function, Φ (·), is used to model the regression function when the dependent variable is binary. Formally, the model can be expressed thus:

$$E(Y|X) = P\,(Y = 1|X) = \Phi\,(\beta_0 + \beta_1\,X)$$

Here, the coefficient, β_1, is the change in *z* associated with a one unit change in X. The vector of X's includes all the personal demographics and prior labour market status shown in Table 2. For ease of interpretation, we report the marginal effects for the means of the independent variables in X.

The second sets of models we estimate is the default hazard and this is estimated by the Cox proportional hazard model, controlling for a set of individual and loan characteristics. This model specification has been used in studies researching new firm survival rates (see, for example, Fotopoulos and Louri, 2000) and in research evaluating the effects of public loan schemes (see, for example, Cowling et al., 2023). The dependent variable captures the individual loan time (in days) from its origination date and continues until its default date. If the loan did not default by the end of its term, it was considered repaid, and the entrepreneurs business start-up survived.

We denote the hazard function h(t). The survival time t is measured at the time of the risk default and expressed in days from loan origination. We determine our hazard function h(t) by a set of covariates (vectors X_k, S_k, J_k, and W_k) and the corresponding coefficients α_k, which measure the effect of this set of covariates on survival time. The subscript *I* represents each individual firm loan contract, and *j* represents time.

$$H(t) = h0(t) * \exp\{\delta_i + k = 1K_k\,X_{kij\text{-}1} + k = 1K_k\,S_{ki} + Z_{kj} + J_{ik} + W_{kij} + \varepsilon_i\} \quad [1]$$

Given our interest in the survival differences between Scottish Island start-ups, Scottish mainland start-ups, and wider UK start-ups, we include the key dummy variables outlined in Table 1, which delivers information about the Scottish Island group effects. The vector X_k represents our personal and firm demographics (education, age, gender, ethnicity, and prior labour market status). All of these characteristics have been found to be important in determining firm survival and loan default based on the existing literature (Fotopoulos and Louri, 2000). The vector S_k represents loan contract variables. Vector Z captures fixed time effects. We also include an adult population measure defined as the number of adults on the electoral register.

4.2. What's different about Scottish Island start-ups?

From Table 3, we observe that Scottish Island start-up entrepreneurs are 2.5% more likely to be over 50 years of age (broad classification) and 2.3% more likely (narrow classification) than their Scottish mainland peers. Using the narrow island classification, they were also 1.2% more likely to be in the 30–49 age group. Similar findings were apparent when comparing to the wider UK, although the magnitude of these effects were much smaller. This suggests that the decision to start a new business on the Scottish Islands is one that is most likely to be made by mature adults with a considerable amount of life experience which help mitigate so-called "liabilities of newness" in *de novo* start-ups (Politis, 2008).

Using the broad islands classification, we also find that there were significant differences in educational achievement compared to the Scottish mainland and wider UK start-ups. On the former, we find that Scottish Island entrepreneurs were 1.7% less likely to hold a first degree and 4.3% less likely to hold an advanced degree qualification. On the latter, we find that Scottish Island entrepreneurs were less likely to hold a vocational education and an advanced degree. No educational differences were apparent using the narrow island classification. These

Table 3
Characteristics of Scottish Islands Start-ups compared to Whole UK Start-ups

	Broad Scottish Islands Classification								Narrow Scottish Islands Classification							
	Scottish Islands versus Scottish Mainland				Scottish Islands versus Whole UK				Scottish Islands versus Scottish Mainland				Scottish Islands versus Whole UK			
	dF/dx	S.E	z	Pr > z	dF/dx	S.E	z	Pr > z	dF/dx	S.E	z	Pr > z	dF/dx	S.E	z	Pr > z
Age																
18-24																
25–30	−0.0011	0.0096	−0.11	0.913	0.0001	0.0004	0.27	0.786	0.0097	0.0078	1.43	0.154	0.0004	0.0003	1.74	0.082
31–49	0.0052	0.0087	0.60	0.550	0.0005	0.0003	1.57	0.117	0.0118	0.0055	2.16	0.031	0.0005	0.0002	2.67	0.008
50+	0.0247	0.0134	2.09	0.037	0.0013	0.0006	2.68	0.007	0.0229	0.0121	2.57	0.010	0.0011	0.0006	3.05	0.002
Education																
Basic school																
Vocational	−0.0037	0.0068	−0.55	0.585	0.0001	0.0003	0.52	0.606	0.0009	0.0035	0.26	0.791	0.0001	0.0001	0.65	0.513
Advanced school	−0.0051	0.0090	−0.55	0.581	−0.0007	0.0003	−2.23	0.026	−0.0034	0.0042	−0.73	0.463	−0.0002	0.0001	−1.52	0.128
UG Degree	−0.0174	0.0066	−2.43	0.015	−0.0005	0.0003	−1.93	0.054	−0.0043	0.0034	−1.18	0.238	−0.0001	0.0001	−1.04	0.298
PG Degree	−0.0425	0.0060	−3.17	0.002	−0.0014	0.0003	−2.49	0.013	−0.0093	0.0041	−1.41	0.158	−0.0002	0.0002	−1.04	0.299
Prior Status																
Full-time employment																
Part-time employment	−0.0024	0.0114	−0.21	0.836	0.0001	0.0005	0.21	0.833	−0.0029	0.0051	−0.52	0.602	0.0000	0.0002	−0.07	0.947
Inactive	0.0141	0.0166	0.93	0.353	0.0008	0.0007	1.36	0.175	0.0152	0.0113	1.78	0.075	0.0006	0.0004	1.95	0.051
Self-employed (<2 years)	0.0065	0.0075	0.88	0.380	0.0003	0.0003	0.95	0.340	0.0039	0.0039	1.05	0.296	0.0001	0.0001	0.95	0.344
Unemployed	0.0053	0.0074	0.72	0.471	0.0011	0.0004	3.33	0.001	−0.0013	0.0036	−0.34	0.730	0.0001	0.0001	1.04	0.300
Female [0,1]	0.0141	0.0058	2.51	0.012	0.0005	0.0002	2.40	0.016	0.0071	0.0030	2.44	0.015	0.0002	0.0001	2.34	0.019
Ethnic Minority [0,1]	−0.0329	0.0065	−3.48	0.001	−0.0021	0.0002	−6.45	0.000	−0.0121	0.0027	−2.52	0.012	−0.0006	0.0001	−3.71	0.000
ln Registered Voters	−0.2936	0.0200	−16.17	0.000	−0.0175	0.0013	−25.65	0.000	−0.1133	0.0111	−14.87	0.000	−0.0051	0.0008	−21.62	0.000
No. Observations	6,368				99,029				6,368				99,029			
Prob>χ2	0.0001				0.0001				0.0001				0.0001			
Pseudo R2	0.1304				0.1724				0.2295				0.2684			

findings suggest that Scottish Island entrepreneurs are, on average, less well educated than their Scottish mainland peers, and thus have lower levels of formal human capital, but they do appear to have more life experience which is a measure of accumulated informal human capital.

There were also some differences in terms of transition routes into new business start-up. On this, we find that Scottish Island entrepreneurs are 0.16% more likely to transition from unemployment compared to their wider UK peers (broad island classification) and 0.01% more likely to transition from an inactive labour market status (narrow island classification). This might suggest that Scottish Island entrepreneurs have a higher rate of transition into start-up for what Thurik et al. (2008) term the 'refugee effect'. This leaves the concerns of Danson et al. (2021) in the balance regarding the shifting of social risk to those least able to bear it. This question will be addressed subsequently when we consider survival rates for those entering from a position of labour market disadvantage.

Across all models and comparisons, we find that there is a higher new business start-up rate on the Scottish Islands for females and a lower rate for individuals from ethnic minorities. For the Scottish island versus mainland, the differences in female representation are 1.4% (broad classification) and 0.7% (narrow classification). For ethnic minority representation the equivalent differences are −3.3% (broad classification) and −1.2% (narrow classification).

4.3. Do Scottish Island start-ups survive (or fail) more?

Here we report on our default hazard estimates. Before discussing our key findings, we graph the respective 3 and 5 year Kaplan-Meir survival functions for Scottish Island new business start-ups and against their Scottish mainland peers and against the wider UK. These are show in (see online Appendix). In general, we observe that surviving the first three to five years after start-up is difficult and the hazard rates are high as evidenced in previous start-up studies. It is a stark reality that between 40% and 60% of new business start-ups will not exist on their sixth birthday. Whilst this appears a negative aspect of the entrepreneurial start-up process, it can also be interpreted as an example of Schumpeterian productive churn and local economic dynamism where many people start-up but many entrepreneurs do not have the necessary skills, entrepreneurial judgement and self-efficacy to sustain and grow their businesses (Hmieleski and Baron, 2008; Block et al., 2017). Often, once people realise that their business idea is not working out the way they expected, they transition into waged employment with either no financial loss or a relatively modest loss (Taylor, 1996).

The general pattern for Scottish Island start-ups compared to their Scottish mainland peers is that over a three-year window island start-up hazard rates are lower for the first two years and subsequently increase over mainland start-ups. Over a five-year window, their hazard rate is comparable, but with a significant increase in year four. When compared with the wider UK, Scottish Island start-ups have a lower hazard rate until the fourth year and subsequently a higher hazard rate in the five-year survival graph. In the three-year graph the Scottish Island hazard rate is lower over the full three years.

Table 4 reports our proportional hazards modelling. The first point of specific note is that Scottish Island new business start-ups are no more (or less) likely to survive than their Scottish mainland peers. However, using the broad island classification against the wider UK Scottish Island start-ups have a 33.64% higher survival probability. In this sense, being located on a Scottish Island does not appear to act as a barrier to survival as predicted by agglomeration theories of new entrepreneurial activity, nor does it act as a means through which new start-ups can achieve a local monopoly position through offering differentiated products and services. These findings also hold for three and five-year hazard rates.

So what factors are associated with higher or lower survival rates? Within Scotland specifically, transitioning into a new business start-up from unemployment has a very large and significant effect on hazard rates compared to an individual transitioning from full-time employment. The magnitude of the difference in hazard is 168.4%–169.5%. We do not identify any effects on hazard relating to an individual's age or education, but we do establish a significant gender effect with female Scottish start-ups having, on average, a 25.69%–26.06% lower hazard rate than their male peers. Further, entrepreneurs who took out larger SUL loans to support the capitalisation of their start-ups had lower hazard rates in line with credit rationing and financial barrier theories.

The models which compare Scottish Island start-ups against the wider UK show a richer tapestry of factors that have a significant effect on hazard rates. For example, entrepreneurs over the age of 49 had a 34.56%–34.60% lower hazard than entrepreneurs under the age of 26. This suggests that accumulated life experience matters for business survival. Education was also found to be important and on this we find that 'Advanced' school level qualifications are associated with a 14.39%–14.49% higher hazard rate, and a first degree with a 12.39%–12.42% lower hazard rate. This shows that formal human capital matters as well as life experience.

Transition pathways into new business start-up were also important. Here, we find that entry from part-time employment increased hazard rates by 29.95%, from inactivity by 17.32–17.42%, and from unemployment by 95.71%–95.83%, when compared to entry from full-time employment. We observe that female start-ups had a significantly lower hazard rate and were 19.32%–19.37% less likely to fail than their male peers. In contrast, ethnic minority start-ups were 9.43%–9.45% more likely to fail than their white peers. On gender, we note that the female survival effect was stronger in Scotland than in the wider UK. Finally, we observe that (real) SUL loan amounts were associated with lower hazard rates suggesting that initial capitalisation is an important factor in determining subsequent survival or failure rates (Marlow and Patton, 2005).

5. Discussion

This paper makes a number of novel contributions to the literature on the economic geography of new business formation and EEs. In terms of the paper's key empirical contribution, we demonstrate both key observable differences (and similarities) between Island-based start-ups and their counterparts on the UK mainland. Turning to the paper's first key research question, it is quite apparent that there are quite discernible traits which mark out Island entrepreneurs from their Scottish and UK counterparts: they tend to be older, less well educated, more likely to be female, and less likely to be from ethnic minorities. The age finding may be a function of the fact that the average age of the population of Islands is higher than the Scottish mainland. The median age in the Scottish islands was estimated to be 49.9 years (Scottish average 42.1 fact years) in June 2020.[5] The relative absence of start-ups from ethnic minorities is also consistent with the low presence of minorities in Scottish Islands. In Orkney and Outer Hebrides, the share of population registered as non-white is the lowest across Scotland, 1.7% against the country average of 5%.[6] Another notable demographic finding was the greater incidence of female entrepreneurs compared to their male counterparts. We can speculate that this may owe to greater levels of "life-style" firms being launched in these locations which are often ventures favoured by female entrepreneurs (Lerner and Almor, 2002). The fact that Island entrepreneurs had lower levels of formal human capital in terms of academic qualifications and borrowed less money via the SUL scheme that their mainland counterparts may also corroborate more of a focus on less growth-oriented business activities by these entrepreneurs (Goedhuys and Sleuwaegen, 2016).

[5] https://www.cne-siar.gov.uk/strategy-performance-and-research/outer-hebrides-factfile/population/overview/#:~:text=The%20median%20age%20in%20the,1%2C100%20persons%20(%2D4.0%25)

[6] https://www.scotlandscensus.gov.uk.

Table 4
Survial Rates of Scottish Island Start-ups compared to Whole UK Start-ups

	Broad Scottish Islands Classification								Narrow Scottish Islands Classification							
	Scottish Islands versus Scottish Mainland				Scottish Islands versus Whole UK				Scottish Islands versus Scottish Mainland				Scottish Islands versus Whole UK			
	Hazard Ratio	S.E	z	Pr > z	Hazard Ratio	S.E	z	Pr > z	Hazard Ratio	S.E	z	Pr > z	Hazard Ratio	S.E	z	Pr > z
Scottish Island [0,1]	1.1523	0.2396	0.68	0.495	0.6636	0.1330	−2.05	0.041	1.6670	0.4741	1.80	0.072	0.9184	0.2550	−0.31	0.759
Age																
18-24																
25–30	0.8734	0.1491	−0.79	0.428	0.9310	0.0285	−2.33	0.020	0.8722	0.1489	−0.80	0.423	0.9308	0.0285	−2.34	0.019
31–49	0.8246	0.1291	−1.23	0.218	0.6521	0.0194	−14.35	0.000	0.8213	0.1286	−1.26	0.209	0.6519	0.0194	−14.36	0.000
50+	0.7705	0.1561	−1.29	0.198	0.6544	0.0265	−10.49	0.000	0.7648	0.1550	−1.32	0.186	0.6540	0.0264	−10.50	0.000
Education																
Basic school																
Vocational	0.9273	0.1284	−0.55	0.586	0.9460	0.0273	−1.92	0.054	0.9297	0.1287	−0.53	0.598	0.9460	0.0273	−1.92	0.054
Advanced school	0.7652	0.1779	−1.15	0.250	1.1439	0.0380	4.04	0.000	0.7663	0.1781	−1.14	0.252	1.1449	0.0381	4.07	0.000
UG Degree	0.9780	0.1532	−0.14	0.887	0.8758	0.0277	−4.20	0.000	0.9792	0.1534	−0.13	0.893	0.8761	0.0277	−4.19	0.000
PG Degree	0.8688	0.3277	−0.37	0.709	1.1155	0.0710	1.72	0.086	0.8782	0.3310	−0.34	0.730	1.1169	0.0711	1.74	0.083
Prior Status																
Full-time employment																
Part-time employment	0.5805	0.2211	−1.43	0.153	1.2996	0.0554	6.15	0.000	0.5772	0.2199	−1.44	0.149	1.2995	0.0554	6.14	0.000
Inactive	1.1079	0.3860	0.29	0.769	1.1742	0.0655	2.88	0.004	1.1076	0.3857	0.29	0.769	1.1732	0.0655	2.86	0.004
Self-employed (<2 years)	1.1731	0.2122	0.88	0.377	1.0715	0.0338	2.19	0.028	1.1680	0.2113	0.86	0.391	1.0714	0.0338	2.19	0.029
Unemployed	2.6951	0.4541	5.88	0.000	1.9583	0.0605	21.76	0.000	2.6839	0.4523	5.86	0.000	1.9571	0.0604	21.74	0.000
Female [0,1]	0.7431	0.0851	−2.59	0.009	0.8063	0.0178	−9.74	0.000	0.7394	0.0847	−2.64	0.008	0.8062	0.0178	−9.75	0.000
Ethnic Minority [0,1]	1.0534	0.2107	0.26	0.795	1.0943	0.0277	3.57	0.000	1.0553	0.2110	0.27	0.788	1.0955	0.0277	3.61	0.000
ln Real Loan Amount	0.6555	0.0489	−5.66	0.000	0.6440	0.0092	−30.97	0.000	0.6524	0.0488	−5.71	0.000	0.6440	0.0092	−30.97	0.000
LR $\chi 2$	188.07				3,392.91				190.40				3,388.18			
Prob>$\chi 2$	0.0001				0.0001				0.0001				0.0001			
No. subjects	6,397				99,863				6,367				99,863			
No.failures	357				9,057				357				9,057			

Turning to our second research question, again we found some quite perceptible empirical distinctions between these entrepreneurs and their mainland Scottish counterparts. However, we find no significant differences in new business start-up failure rates on the Scottish Islands compared to mainland Scotland or the wider UK. Our Scottish island-versus-mainland results suggest that island start-ups have a distinct honeymoon period after starting, but that this drops off within two to four years when survival becomes more problematic. In terms of the effectiveness of the hazardous transitioning process into entrepreneurship, those previously unemployed appeared to be (acutely) the most vulnerable to business failure. These findings offer some support for the quality of ideas hypothesis advanced by Dinlersoz et al. (2023) in that it may be that 'refugee' start-ups (Thurik et al., 2008), on average have lower quality ideas and are thus more likely to fail. It may also offer some support for the lack of ability of disadvantaged labour market status individuals to generate products and services with enough differentiation as outlined in the intermediate goods and services theory of Gries and Naudé (2009).

The paper also makes important theoretical contribution to the growing literature on the resilience of fragile EEs. Remote Islands are in theory some of the most resource constrained entrepreneurial locations, especially in terms of spatial peripherality, financial constraints, network scarcity and market access (Freitas and Kitson, 2018; Booth et al., 2020; Glückler et al., 2023). Despite this, our study shows that while comprised of a different cohort of archetypical entrepreneurs (older and more females) they do resemble both Scottish and UK start-ups in terms of their survival chances. Indeed, the female Island entrepreneurs have a greater level of longevity than their mainland peers.

While further qualitative research would be needed to fully tease out the specific reasons behind this entrepreneurial resilience, we can speculate that the relatively "thin" EEs confronting Island entrepreneurs are not insurmountable for proactive and effective entrepreneurs. As such, this stresses the strong role of entrepreneurial agency in shaping EEs (Brown and Mason, 2017). In other words, liabilities of distance issues can be mitigated in certain circumstances by rural entrepreneurs, especially those operating as life-style and service-based firms which are often oriented towards local markets (Roundy, 2017; Frimanslund, 2022; Nielsen, 2022). Therefore, paradoxically, the sheer degree of remoteness may act as a form of "spatial protection" from urban competition for some types of rural start-ups (Lavesson, 2018). So, in certain instances geographical peripherality can be overcome by forms of cognitive, organizational and network proximity (Fitjar and Rodríguez-Pose, 2011).

Finally, the paper also makes and important contribution to the contentious policy debates surrounding the support for start-ups (Shane, 2009). This debate is particularly applicable to the start-up programmes which particularly target the unemployed – so-called refugee start-ups (Thurik et al., 2008) – which often have mixed levels of success (Dvouletý and Lukeš, 2016). The very high attrition rate of so-called "refugee" start-ups in our study has quite clear policy ramifications. In the context of the "quality of ideas" thesis posited by Dinlersoz et al. (2023), this would imply that unemployed start-ups have lower quality business concepts. A specific concern raised by Danson et al. (2021) is that the sustained policy support for unemployment to self-employment in the UK effectively shifts the social risks and responsibilities for work from the state and private sector employers to those individuals with the least capacity to accommodate them.

Our work also suggests that there should perhaps be more customisation of entrepreneurship policies such as SULs. There is no single ideal entrepreneurship policy formula because entrepreneurial mechanisms take different forms in different places (Ortega-Argilés, 2022). On this basis, we suggest that there is a pivotal role for public policy to play in either discouraging entry directly from unemployment and instead focusing on delivering greater job opportunities for the unemployed, and/or in providing an in-depth advisory support to ensure that unemployed people have the requisite skillset to commence their own business successfully. Given the stronger survival rate in Island female entrepreneurs this type of programme may wish to particularly target male *de novo* entrepreneurs.

6. Conclusions

We set out to fill a gap in our understanding about the composition of new start-ups and survival rates which to date has largely ignored islands as a distinct and unique spatial "unit of analysis". Our focus was on the islands of Scotland which have a rich and distinct history, geography, and linguistic tradition as well as being physically remote from the centres of economic activity in Scotland and the wider UK mainland. In terms of the paper's key empirical contribution, we demonstrate both key observable differences (and similarities) between Island-based start-ups and their counterparts on the UK mainland. Despite the key observable differences between Island entrepreneurs and their mainland counterparts, their ability to survive in spite of their remoteness shows a strong level of entrepreneurial resilience within these fragile EEs. Indeed, the hardship of resource-scarce, even hostile environments seems to drive entrepreneurial resourcefulness (Isenberg, 2011). This partly confounds our *a priori* theoretical expectations.

This study has limitations. While the rich dataset examined afforded us the opportunity to closely probe the nature of entrepreneurship in Island communities, owing to the fact these firms have all been publicly assisted through the SULs this does open up certain "selection" issues. To address these selection issues further research could examine cohorts of assisted and non-assisted firms to detect any difference or similarities between the two cohorts. While the Scottish spatial context is unique, these Islands confront similar circumstances germane to other spatially remote and isolated islands communities in other EU countries such as Norway and other parts of Scandinavia (Burnett and Danson, 2017) which clearly opens up opportunities for replication research elsewhere.[7] A rich and fertile research agenda awaits those keen to further explore the nuances and specificities of entrepreneurship within these unique types of remote EEs.

CRediT authorship contribution statement

Marc Cowling: Data curation, Formal analysis, Investigation, Methodology, Visualization, Writing – original draft. **Ross Brown:** Conceptualization, Project administration, Writing – original draft, Writing – review & editing. **Stefanos Ioannou:** Writing – original draft, Writing – review & editing.

Declaration of competing interest

We hereby declare there is no conflict of interest associated with this paper.

Data availability

The data that has been used is confidential.

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[7] We wish to thank one of the reviewers for making this salient suggestion.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jrurstud.2024.103417.

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